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The Effects of Chatbots on Customer Services Jobs - Does Using Chatbots Mean Losing the Human Jobs?

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Abstract: As chatbots progressively replace employees in customer support, studies on their influence on customer satisfaction, customers' planning of the repurchasing, and customers' recommendations of goods and services are rapidly expanding, assisting businesses in identifying implementable technical solutions that decrease labor expenses while preserving purchaser retention. However, the topic of influence of chatbots on the labor market mostly consists of sensationalist claims in the media about the disappearance of human job positions in customer service with the observable lack of rigorous empirical studies on the extent of job losses, AI-human collaboration models, and customer preferences. The findings of this study indicate that chatbot implementation has led to a moderate reduction in customer service staffing, with the largest effects in sectors characterized by routine inquiries. However, qualitative evidence shows that companies are mostly restructuring job roles rather than engaging in large scale layoffs, with many employees transitioning into more complex or strategic tasks. Customer satisfaction improved slightly, following digitalization and automation of customer service, suggesting that chatbots can enhance service efficiency when integrated into hybrid models. The Serbian context, particularly language adaptation challenges and uneven financial resources, and organizational readiness, continues to shape the pace and outcomes of implementation. These results highlight the need for targeted training and coordinated emplozee development policies to help employees in customer service adapt to changing job requirements.

Keywords: *Chatbots, customer services, jobs, job loss, hybrid models, customer preferences.*

Introduction

As chatbots increasingly replace human agents in customer support, research on their impact on customer satisfaction and repurchase intentions or product and service recommendations is rapidly expanding. At the same time, the implementation of chatbots in customer service departments has become widespread, and such research often helps companies identify optimal technological solutions that reduce labor costs while maintaining or improving customer retention. Customers can also express their satisfaction or dissatisfaction with new products and services, and the quality of information they receive, especially in the context of complaint resolution, through social media and review pages (like Google review options).

In parallel, headlines, both in daily newspapers and reputable business magazines, often sensationally claim that human work in customer support will soon disappear and that large numbers of employees will be laid off (Sirimanne, 2023; Carbonaro, 2023; Wiseman, & Associated Press, 2024; Elwan, 2025; Meenakshi, & Ayush, 2025). However, rigorous empirical research that can reliably estimate the extent of potential job losses, explore possible models of cooperation between artificial intelligence and employees, and identify how and in which sectors replaced customer service agents can apply their existing knowledge, skills, and abilities are missing. For companies, it is often more about understanding whether consumers prefer to have conversation with a person or a chatbot, which may be key to

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understanding future job losses in this area (Cheng, Zhang, Cohen, & Mou, 2022; Sirimanne, 2023; Silva, Shojaei, & Barbosa, 2023; Babashahi, Barbosa, Lima, Lyra, Salazar, Argôlo, Almeida, & Souza, 2024).

In the context of Serbia, where digital transformation is accelerating but with specific challenges such as technological and financial barriers for small businesses and an unemployment rate of around 9%, this research will try to fill the gap with empirical data from available statistical data and reports and interviews with HR managers of companies in various sectors. The focus is on quantifying the loss of full-time agents (ΔFTE), containment rates, and customer preferences, providing a basis for hybrid models and retraining policies.

Literature Review

Customer service is one of the crucial elements of every successful business, like a glass bridge connecting a company to its customers. Imagine a salesperson in a traditional store who, with a smile, listens to a complaint about a poor-quality product and immediately offers a replacement (or it can be quite the opposite, a salesperson who is not willing to listen to the complaints of the customers), that scene is now multiplied in the digital world with thousands of interactions a day. From simple phone calls to sophisticated chats in digital realm, customer service is not just about reacting to problems, but proactive care that builds loyalty and turns regular customers into brand advocates. In the past, customer service was also a personal touch in small businesses, where the owner knew every purchaser by name. Modern businesses introduced call centers, where agents were trained to resolve complaints quickly and efficiently. Today, with the rise of e-commerce, service is expanding across multiple channels like email, social networks, apps and self-service portals, enabling 24/7 borderless support (Huang, & Rust, 2020; Adam, Wessel, & Benlian, 2021; Zhang, Li, & Liu, 2022; Lee, Ju, & Lee, 2023; Ranieri, Di Bernardo, & Mele, 2024; Soori, Arezoo, & Dastres, 2023; Gao, Opute, Jawad, & Zhan, 2025; Marcineková, Sujová, & Ďurica, 2025).

Customer service employees carry a load of emotions, from angry complaints to thank-you notes. Their key missions include resolving issues quickly, such as tracking shipments or issuing refunds; tracking buyer satisfaction through surveys; supporting consumers in the situations where small gestures like personalized offers make a great difference; reporting to and collaborating with other departments to prevent future errors. The health challenges are countless: headaches, high blood pressure, stress, burnout, and the need for empathy in a digital distance, but those who succeed create stories that may go viral, especially in the age of social media. Quality customer service is not an expense, but an investment, studies show that loyal customers spend more (Huang, & Rust, 2020; Cheng, Zhang, Cohen, & Mou, 2022; Zhang, Li, & Liu, 2022; Marcineková, Sujová, & Ďurica, 2025). In the era of reviews on Google and other platforms, one negative story can cost thousands of euros, while a positive one becomes free marketing, and sometimes reviews can make or break businesses. In the end, it is the art of listening that enables a company not only to be profitable, but also to be appreciated and to build a brand.

Artificial intelligence (AI) is a technology that enables machines to simulate human intelligence, including learning, understanding, and decision-making. It is based on machine learning algorithms, neural networks, and deep learning, enabling them to process vast amounts of data faster and more accurately than humans. Artificial intelligence is widely used to automate routine tasks, such as invoice processing, customer support via chatbots, and inventory management, which reduces costs and errors. In marketing, AI analyzes consumer behavior for personalized campaigns and product recommendations, increasing sales. It also predicts machine failures in production and optimizes supply chains. Key benefits are thought to include increased efficiency (automation frees up employees for strategic tasks, speeding up processes by up to 50% in many sectors); better decisions (data analysis reveals trends and risks, e.g. in finance to forecast markets); personalization (improves the customer experience through customized services, such as in retail.

Challenges and the future development is also a significant topic (Huang, & Rust, 2020; Adam, Wessel, & Benlian, 2021; Dwivedi, Hughes, Ismagilova, Aarts, Coombs, Crick, … Williams, 2021; Cheng, Zhang, Cohen, & Mou, 2022; Soori, Arezoo, & Dastres, 2023; Ranieri, Di Bernardo, & Mele, 2024;

Meenakshi, & Ayush, 2025). Implementing AI requires investments in training and infrastructure, along with concerns about data privacy (Soori, Arezoo, & Dastres, 2023). However, companies that implement it are gaining a competitive advantage, with its use growing in Serbia and the region.

Chatbots are a revolutionary tool in customer service, acting as virtual assistants that are able to respond to customer inquiries in real time, 24/7, without tiredness or waiting. Picture a situation where a customer asks for the status of a shipment at night, instead of being left without an answer, the chatbot instantly provides information, tracking, and even suggests next steps, thereby building trust and customer satisfaction. This technology, based on AI and natural language processing, takes over routine tasks, freeing agents for more complex problems. Chatbots may reduce response waiting, and in some cases, such as airlines, may resolve most of inquiries without human intervention, increasing efficiency and reducing costs. They offer personalized recommendations based on purchase history, support multiple languages, and proactively intervene, e.g., reminding about abandoned carts in e-commerce. They also accumulate feedback, transforming customer support into future sales opportunities. Nevertheless, there are some questions, whether the chatbots are providing the true assistance, or the effects are only perceived and whether the customers prefer human interaction and empathy, not only artificial or synthetic empathy which is sometimes actually presenting chatbot inadequacies (Adam, Wessel, & Benlian, 2021; Castelo, Boegershausen, Hildebrand, & Henkel, 2023; Silva, Shojaei, & Barbosa, 2023; Agnihotri, & Bhattacharya, 2024; Gao, Opute, Jawad, & Zhan, 2025; Knutsson, 2025).

The best chatbots are not human replacements, but associates, they routinely direct complex cases to agents with a comprehensive history of conversations, avoiding frustration. At companies like BMW, they handle thousands of inquiries per month, freeing up call centers for high-value interactions. This hybrid type guarantees empathy where it's needed, with scalability for global teams (Cai, Heo, & Yan, 2025). With the advancement of generative AI, chatbots are becoming even smarter, anticipating needs and offering emotional support through tone analysis. However, the key to success lies in continuous training of employees and investing in analytics, where NPS (Net Promoter Score) and conversions are measured for optimization (Marcineková, Sujová, & Ďurica, 2025). Ultimately, they don't just solve problems, they create stories of quickness and attention that customers share, but also stories of their failures to solve some complex customer problems (Adam, Wessel, & Benlian, 2021; Castelo, Boegershausen, Hildebrand, & Henkel, 2023; Silva, Shojaei, & Barbosa, 2023; Agnihotri, & Bhattacharya, 2024).

Scientific literature highlights that chatbots significantly improve customer service efficiency, reducing response times by half and support costs by a third, while increasing customer satisfaction (CSAT) by 12-30% compared to traditional customer service channels. Studies show that they handle the most of routine inquiries, freeing agents for complex cases, with highest resolution rate in hybrid systems. Positive impacts on performance are considered to be obvious (Zhang, Li, & Liu, 2022). Empirical research documents that AI chatbots increase conversions and reduce cancellations, thanks to personalization and 24/7 availability. In banking and retail (e.g. Bank of America, Starbucks), they reduce handling times by a half, with higher NPS scores than phone or email support. These effects are particularly pronounced in e-commerce, where chatbots generate additional sales through proactive recommendations. Negative sides are also very important, especially when chatbots fail to produce real support and are unable to solve complex problems (Adam, Wessel, & Benlian, 2021; Castelo, Boegershausen, Hildebrand, & Henkel, 2023; Silva, Shojaei, & Barbosa, 2023; Agnihotri, & Bhattacharya, 2024; Elwan, 2025; Gao, Opute, Jawad, & Zhan, 2025).

The literature warns of double effects, chatbots do replace lower-level jobs (up to a 20%), and transform agent roles towards strategic tasks, increasing productivity by 80%. A 2025 study concludes that they do not lead to mass layoffs, but require retraining for AI collaboration, with most of the companies reporting faster complaint resolution. Despite the benefits, scientists highlight problems such as lower empathy in complex emotional interactions (more than two thirds of customers prefer human customer service employees for complaints) and the need for continuous training of AI models to avoid errors (Elliott, 2018; Zhang, Li, & Liu, 2022; Cai, Heo, & Yan, 2025; Meenakshi, & Ayush, 2025). Current research predicts hybrid models as optimal, co-working between humans and AI, with a focus on empathy, problem solving, ethics, and data privacy (Adam, Wessel, & Benlian, 2021; Castelo, Boegershausen, Hildebrand,

& Henkel, 2023; Silva, Shojaei, & Barbosa, 2023; Agnihotri, & Bhattacharya, 2024).

3. Methods and Measures

The study draws on a mixed method design to examine how the introduction of chatbots has influenced employment patterns in customer service departments in Serbia. Quantitative data were obtained from various available statistical and labor reports (HR Lab, 2023; NZS 2022-2024; IBISWorld, 2025; Statistical Office of the Republic of Serbia, 2025), and data sheets provided by the HR managers (with the prominent lacking of these information in published company reports). These data and reports covered the period from 2022 to 2025 and included information on the number of full time employees (FTE), automation indicators such as containment rate, and customer experience metrics. Changes in staffing levels before and after the deployment of chatbots were used to estimate the scale of workforce adjustments.

To complement the statistical data, semi structured interviews were conducted with 20 HR managers from various companies with more than 100 employees (retail, finance and banking, production, transport, logistics, information technologies and communications). Interviews took place online during the summer of 2025 and typically lasted around 30 minutes. Participants were asked about chatbots implementation, retraining initiatives, projected shift toward hybrid human-AI service models, and their perceptions of how digitalization and automation was reshaping customer service roles. All interviews were transcribed and examined using thematic analysis, with attention to differences across sectors and company size. Ethical procedures were followed throughout the study, including informed consent and the protection of organizational anonymity. The main outcome variable was the percentage change in FTEs, calculated as:

$$\Delta FTE = \frac{FTE_{pre} - FTE_{post}}{FTE_{pre}} \times 100$$

Digitalization and automation intensity (measured through containment rate) and customer satisfaction indicators served as key explanatory variables. Triangulation of quantitative and qualitative sources was used to strengthen the reliability of findings.

4. Results

Quantitative data shows that the introduction of chatbots was associated with an average decrease of 17.8% in customer service FTEs. The extent of change varied by sector: retail companies recorded the largest decline, while financial institutions experienced more modest reductions, reflecting the higher share of complex inquiries that still require human intervention. Digitalization and automation levels were relatively high across all sectors, with an average containment rate of 70%. Customer satisfaction scores showed only slight improvements, following the adoption of automated systems. A summary of sector level results is presented below:

Table 1. A summary of sector level results (Source: Authors' research)

Sector	ΔFTE (%)	Containment Rate (%)	CSAT Improvement
Retail	23.5	78	+0.6
Telecom	14.9	65	+0.3
Finance	11.5	72	+0.5
Average	17.8	70	+0.4

The interview data provide additional insight into how organizations are managing the transition to automated service channels. Three topics appeared consistently across responses. Firstly, managers emphasized the growing reliance on chatbots for routine inquiries, which has reduced the need for entry level customer service roles. Secondly, many companies are moving toward hybrid service models in which human agents focus on more problematic or complex communications. This shift has initiated new training programs aimed at developing analytical, communication, and problem solving skills of customer service employees. Thirdly, several respondents noted challenges specific to the Serbian context, including the budget, the need for improved language adaptation in chatbot systems, and varying levels of organizational readiness for digital transformation.

Taken together, the findings suggest that the introduction of chatbots has led to noticeable but not uniform reductions in customer service staffing. Rather than large scale displacement, the evidence points to a gradual restructuring of roles, with automation absorbing routine tasks and customer service employees moving toward more specialized functions.

Discussion

The findings of this study show that the introduction of chatbots has had a measurable, though uneven, impact on employment in Serbian companies customer services. The average reduction of 17.8% in FTEs suggests that digitalization and automation is reshaping staffing structures, particularly in sectors where customer inquiries are highly standardized. Retail companies, for example, reported the largest declines, which is consistent with the high proportion of routine, repetitive interactions that can be digitalized and automated with quite small risk. In contrast, financial institutions experienced more modest reductions, reflecting the continued need for human judgment in complicated or complex cases.

Although the quantitative data point to a noticeable contraction in customer service roles, the qualitative findings provide important distinction. HR managers consistently emphasized that digitalization and automation has not resulted in widespread layoffs. Instead, companies appear to be reallocating human labor toward tasks that require interpersonal skills, analytical, or problem solving abilities. The shift toward hybrid service models, where chatbots handle routine inquiries and human agents manage escalations, illustrates how digitalization and automation can coexist with customer service employees rather than replace them entirely, which is in line with contemporary research by Zirar, Ali, & Islam (2023), Babashahi, Barbosa, Lima, Lyra, Salazar, Argôlo, Almeida, & Souza (2024), and Cai, Heo, & Yan (2025). This pattern aligns with broader research suggesting that AI adoption often leads to job transformation rather than simple displacement which is in line with current research as Ranieri, Di Bernardo, & Mele (2024) and Meenakshi, & Ayush (2025).

The interviews also highlight several contextual factors that shape how automation unfolds in Serbia. Language adaptation remains a challenge, particularly for expressions that are difficult for automated systems to interpret. Organizational readiness varies as well; some companies have established training programs and clear transition paths, while others are still adjusting their internal processes to accommodate new technologies. These differences help explain why the impact of chatbots is not uniform across sectors or regions. Customer experience indicators provide another layer of insight. The modest improvement in CSAT scores following chatbot implementation suggests that digitalization and automation has not compromised customer service quality. In some cases, faster response times and consistent handling of routine inquiries may have contributed to these gains. However, the qualitative data indicate that customers still prefer human interaction for complex issues, reinforcing the need for balanced customer service models.

Taken together, the results point to a gradual restructuring of customer service work rather than abrupt workforce reductions. Digitalization and automation is clearly reducing the demand for entry level roles, but companies are simultaneously investing in training and increasing the responsibilities of remaining staff. This transition raises significant strategy concerns. Given Serbia's labor market conditions and the skill requirements of emerging customer service roles, targeted training could help employees to adapt to changing job demands and reduce the risk of long term unemployment. Overall, the study

shows that chatbot adoption is reshaping customer service employment in Serbia, but the process is more evolutionary than disruptive. The combination of quantitative and qualitative evidence emphasizes the importance of viewing digitalization and automation not only as a technological change but also as an organizational and social one.

Implications and Conclusion

The findings of this study carry several implications for organizations, policymakers, and the broader labor market in Serbia. For companies, the results emphasize the importance of approaching chatbot adoption as a process of organizational transformation rather than a purely technical upgrading. While digitalization and automation can reduce the volume of routine job tasks, the shift toward hybrid service models may require investment in employee development. Training programs that strengthen communication and analytical skills, and digital literacy appear critical for empowering existing employees to transition into more complex job roles. Businesses that disregard this aspect risk widening internal skills gaps and limiting the benefits of digitalization and automation.

From a policy perspective, the study suggests a need for targeted support mechanisms that help employees to adapt to technological change. Given the uneven impact of digitalization and automation across sectors and regions, training subventions or public-private partnerships could play a role in reducing adjustment costs, particularly for employees in entry level customer service positions. Strengthening vocational programs in digital service competencies may also help align the labor force with emerging job requirements. Additionally, the challenges related to language adaptation in chatbot systems point to an opportunity for local technology development, which could improve service quality while reducing dependence on imported solutions. Finally, the results have implications for the broader debate on digitalization, automation and employment. The evidence from Serbia indicates that job restructuring is more common than large scale lay-offs. This suggests that the long term effects of digitalization and automation will depend not only on technological capabilities but also on how organizations design their customer service models and how effectively employees are supported during transitions.

The results of this study show that introduction of chatbots has led to a measurable reduction in customer service staffing, with an average decline of 17.8% across the sample. However, the qualitative findings clarify that these cutbacks do not equate to widespread job loss. Instead, companies are restructuring their customer service structures, shifting routine tasks to digitalized and automated systems while expanding the responsibilities of employees in areas that require judgment, receptiveness and empathy, or specialized knowledge. The sectoral variances observed in the study emphasize the significance of contextual factors such as budgets, customer service complexity, organizational readiness, and language adaptation. Customer satisfaction indicators improved slightly following chatbot implementation, suggesting that digitalization and automation can enhance service efficiency without undermining user experience when deployed appropriately.

Overall, the findings highlight a gradual evolution of customer service configuration, rather than sudden technological shift. As digitalization and automation continues to advance, the key challenge for organizations will be to ensure that the employees are equipped with the skills needed to thrive in increasingly hybrid customer service environments. Continuous attention to training, flexibility and adaptation, and responsible implementation will be crucial for maximizing the benefits of digitalization and automation while mitigating its potential risks.

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